BP’s refineries are applying new technologies that help produce cleaner, more energy-efficient fuels from a wide variety of oil and gas resources, as well as sources such as vegetable and animal fats and oils.

BP’s refining technology teams have the scientific knowledge required to safely and reliably process these new resources in a cost-effective way.

“Understanding feedstocks at the molecular level allows us to optimize our processes and is key to running an efficient refining business,” says Andrew Waller, technology development director with BP’s refining, technology and engineering team.

**Intelligent operations**

Meanwhile, BP is creating a digitally enabled manufacturing future, deploying cutting-edge technology at its refineries and petrochemicals sites.

- In partnership with Beyond Limits, a California-based spinoff of NASA’s Jet Propulsion Laboratory, BP is applying the same artificial intelligence (AI) that directs the Mars Rover in creating a cognitive agent that advises real-time, complex process optimization decisions.

- BP will soon be able to stream nearly 1 million process sensors from all its manufacturing sites to a central data platform at sub-second intervals. This will allow the modeling of all its systems on a common platform.

- At its Cherry Point Refinery, BP is building machine-learning applications that automatically analyze historic laboratory tests and operations data to enhance process optimization with AI solutions.

**Safer facilities**

BP’s expertise in advanced analytical techniques, coupled with a deep understanding of process technologies, allows its teams to predict how crude oils or other feedstocks may affect individual refinery units.

The company also is developing new methods to monitor refining infrastructure for corrosion, fouling and process upsets, enabling teams to make real-time risk evaluations and take actions to promote safe, optimal performance.

**Formulated products**

For more than a century, Castrol — BP’s global lubricants brand — has pioneered innovative technologies that can be used in extreme environments.

NASA has once again turned to Castrol’s Braycote line to keep its Mars InSight lander, currently studying what’s below the Red Planet’s surface, running smoothly.

Back on Earth, Castrol is offering a growing number of carbon-neutral products, several of which have been accredited through BP’s Advancing Low Carbon program. They include EDGE Bio-Synthetic and Magnatec Bio-Synthetic, which are made with 25 percent sugarcane-derived oil compounds.

Castrol also makes other carbon-neutral engine oils (EDGE Professional), carbon-neutral lubricants for the wind industry (Optigear) and carbon-neutral lubricants for the commercial trucking industry (VECTON).

In the wind sector, Castrol has a joint venture called ONYX InSight, a digital monitoring platform that helps wind farm operators track the condition of turbines, optimize maintenance and reduce operating costs. ONYX InSight has deployed this technology to thousands of turbines across the U.S. wind market.